

## Guiding Questions Activity 1

- What is motion? How can we describe motion?

Before we can begin to measure motion we must first try to describe it. I generally start this topic by reading a short section of a book by Agatha Christie. I explain that the subject of this paragraph is sitting in a moving train looking out the window when a train traveling in the same direction as the one she is in pulls along side of hers.

*“For a time the two trains ran parallel, now one gaining a little, now the other. Mrs. McGillicuddy looked from her window through the windows of the parallel carriages. Most of the blinds were down, but occasionally the occupants of the carriages were visible. The other train was not very full and there were many empty carriages. At the moment when the two trains gave the illusion of being stationary, a blind in one of the carriages flew up with a snap. Mrs. McGillicuddy looked into the lighted first-class carriage that was only a few feet away. Then she drew her breath in with a gasp and half rose to her feet. She saw...”*

This quote is from Agatha Christie’s What Mrs. McGillicuddy Saw! I deliberately stop the reading at that point to hopefully encourage them to get the book and read it.

Ask students if they ever experienced something like this. For example, have they ever been sitting in a bus that happens to be parked closely to another bus that is also parked? Then suddenly the other bus pulls forward and as you look out the bus window you are fooled into thinking that your bus is moving backward? Or, while traveling in a car doing sixty miles an hour another car begins to pass. As you look out the window of your car you get the feeling that neither your car nor the other is moving. You can see clearly the passengers in the other car. You could even describe what they were wearing. Then suddenly the second car speeds up and finishes passing.

All things in this universe are in motion. The motion of any object is relative and can be described only in reference to other objects. The object used for the frame of reference is assumed to have a fixed

**position and provides a backdrop against which the moving object changes position. So, for example, your frame of reference for the bus is the moving bus. Ask students what the frame of reference is for the cars.**

**Another example might be watching a sunset. As the sun slowly sinks below the horizon you might wonder is it really moving or is it the earth? Even though the sun appears to move you know it's the earth moving. Again ask students to identify the frame of reference used while watching the sunset. Then ask: Is the sun standing still or is it moving?**

**Suppose you are riding in a school bus. You get up and begin to walk to the back of the bus. Some one standing on the sidewalk watches the bus pass by and sees you walking inside. Ask students: What is your frame of reference as you walk to the back of the bus? What is the frame of reference being used by the person standing on the sidewalk?**

**Finally, it might be noted that astronauts traveling at over 17,000 miles per hour feel no sensation of movement because there is nothing nearby with which to compare their movement.**

**When an object is described as moving it is always being compared with something that is assumed to be stationary or not moving.**